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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,641	04/21/2004	James C. Withers	MER 03.01	5332
27667	7590	10/11/2006	EXAMINER	
HAYES, SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718			ROE, JESSEE RANDALL	
			ART UNIT	PAPER NUMBER
			1742	
DATE MAILED: 10/11/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/828,641	<b>Applicant(s)</b> WITHERS ET AL.	
	<b>Examiner</b> Jessee Roe	<b>Art Unit</b> 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on July 7, 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) 16,26,28,29,32-45,47-53,81-84,86, and 106-109 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,11,12,54,55,58-61,64-66,76,77,85 and 89-95 is/are rejected.
- 7) ☐ Claim(s) 59 is/are objected to.
- 8) ☒ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on April 21, 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____  |

Continuation of Disposition of Claims: Claims pending in the application are 1,11,12,16,26,28,29,32-45,47-55,58-61,64-66,76,77,81-86,90-95 and 106-109.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :(1) September 20, 2004 (2) May 16, 2005 (3) July 15, 2005, and (4) June 19, 2006.

**DETAILED ACTION**

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 85, and 89-95, drawn to method of producing a metal by reducing an anode, classified in class 205, subclass 367+.
- II. Claims 16, 26, 28-29, and 32-35, drawn to an electrolytic cell, classified in class 204, subclass 243.1.
- III. Claims 36-45 and 52-53, drawn to an anode for an electrolytic cell, classified in class 204, subclass 294.
- IV. Claim 47, drawn to a molten salt electrolyte comprising a eutectic of sodium chloride, lithium chloride, and potassium chloride, classified in class 205, subclass 367+.
- V. Claim 48, drawn to a molten salt electrolyte comprising a eutectic of potassium fluoride, sodium fluoride, and lithium fluoride, classified in class 205, subclass 367+.

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- VI. Claim 49, drawn to a molten salt electrolyte comprising a eutectic of sodium chloride, calcium chloride, and potassium chloride, classified in class 205, subclass 367+.
- VII. Claims 50-51, drawn to a metal, classified in class 148, subclass 400 or Class 75, subclass 255.
- VIII. Claims 81-84 and 86, drawn to a method for purifying rutile, classified in class 423, subclass 69+.
- IX. Claim 106, drawn to a molten salt electrolyte mixture, classified in class 205, subclass 367+
- X. Claims 107-109, drawn to a method of producing a metal by reducing a cathode, classified in class 205, subclass 398.

Inventions I and II and X and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, reduction of an anode as in I or reduction of

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a cathode as in X may be performed in a galvanic cell rather than an electrolytic cell as in II.

Inventions I and III and X and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, reduction of an anode as in I or reduction of a cathode as in X may be performed in a galvanic cell rather than at an anode or cathode for an electrolytic cell as in III.

Inventions IV and V are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, only one of the molten salt eutectics was disclosed for each of the examples and the molten salt mixtures consist of metal chlorides for IV and metal fluorides for V.

Inventions VI and V are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, only one of the molten salt eutectics was disclosed for each of the examples and the molten salt mixtures consist of metal chlorides for VI and metal fluorides for V.

Inventions IV and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, IV

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is a molten salt electrolyte eutectic of metal chloride whereas IX is a fluorine/chlorine salt mixture.

Inventions V and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, V is a molten salt electrolyte eutectic of metal fluoride whereas IX is a fluorine/chlorine salt mixture.

Inventions VI and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, VI is a molten salt electrolyte eutectic of metal chloride whereas IX is a fluorine/chlorine salt mixture.

Inventions IV and VI are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, only one of the molten salt eutectics was disclosed for each of the examples and the molten salt mixtures consist of sodium, lithium, and potassium metals for IV and the molten salt mixtures consist of sodium, calcium and potassium metals for VI.

Inventions I and IV, I and V, I and VI, and I and IX are directed to an unrelated product and process. Product and process inventions are unrelated if it can be shown that the product cannot be used in, or made by, the process. See MPEP § 802.01 and

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§ 806.06. In the instant case, the process of reducing an anode does not produce a molten salt electrolyte

Inventions I and VII and I and X are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In this case, a metal, VII, may be produced by sintering rather than by reduction of an anode, I, or reduction of a cathode, X.

Inventions I and VIII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions have different effects. The different inventions are not disclosed as being used together. The effect of I is production of a metal. The effect of VIII is removing impurities.

Inventions II and III are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product, and the species are patentably distinct (MPEP § 806.05(j)). In the instant case, the intermediate product, III, is deemed to be useful for performing half of the total reaction and the inventions are deemed patentably distinct because there is nothing on this record to show them to be obvious variants.



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Inventions II and IV, II and V, II and VI, and II and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, II is an apparatus whereas IV, V, VI, and IX are aqueous compositions. II is not used in conjunction with IV, V, VI, or IX. An electrolytic cell is a means for conducting a reaction. A molten salt electrolyte is a medium to conduct a reaction in.

Inventions III and IV, III and V, III and VI, and III and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, III is an apparatus whereas IV, V, VI, and IX are aqueous compositions. III is not used in conjunction with IV, V, VI, or IX. An anode of an electrolytic cell is a means for conducting a reaction. A molten salt electrolyte is a medium to conduct a reaction in.

Inventions IV and VII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, IV is not used in conjunction with VII. IV is aqueous salt solution and is a medium in which a metal, VII, is produced.

Inventions IV and VIII, V and VIII, VI and VIII, and VIII and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP §

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802.01 and § 806.06). In the instant case, IV, V, VI, or IX is not used in conjunction with VIII. IV, V, VI, and IX are different aqueous salt solutions. IX is a method of purifying a rock mineral.

Inventions X and IV, X and V, X and VI, and X and IX are directed to an unrelated product and process. Product and process inventions are unrelated if it can be shown that the product cannot be used in, or made by, the process. See MPEP § 802.01 and § 806.06. In the instant case, the process of reducing an cathode does not produce a molten salt electrolyte.

Inventions III and VII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions, are not capable of use together because the production of the metal depends on the destruction of the anode. The effect of the anode is a reaction in the electrolyte medium. As a result of this reaction a metal VII is formed.

Inventions III and VIII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the electrolytic cell is an apparatus and rutile processing is a method. They are not disclosed as capable of use together. The rutile processing is a means of removing impurities from a metal oxide. The electrolytic cell is a means for conducting a reaction.

Inventions V and VII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs,

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modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, V is an molten salt electrolyte composition and VII is a metal composition.

Inventions VI and VII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, VI is an molten salt electrolyte composition and VII is a metal composition.

Inventions VII and VIII are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, VII is a metal composition and VIII is a method of removing impurities from a rock material.

Inventions VII and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, VII is a metal composition and IX is a fluorine/chlorine electrolyte mixture.

Inventions VII and X are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, a metal, VII, may be produced by sintering rather than by reduction of a cathode, X.

Inventions VIII and IX are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs,

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modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, VIII is directed at purifying a rock mineral, whereas IX is a molten salt electrolyte mixture.

Inventions VIII and X are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, VIII is directed at purifying a rock mineral, whereas X is directed at producing a metal via cathode reduction.

Inventions IX and X are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, IX is a molten salt electrolyte mixture, whereas X is directed at producing a metal via cathode reduction.

Claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 85, and 89-95 generic to the following disclosed patentably distinct species: titanium, chromium, hafnium, molybdenum, niobium, tantalum, tungsten, vanadium, and zirconium. The species are independent or distinct because the production of these metals will require different process parameters. Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, even though this requirement is traversed.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required

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because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Norman Soloway on September 22, 2006 a provisional election was made without traverse to prosecute the invention of producing a metal by reducing an anode, consisting of claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 85, 89-95. In addition, an election of species was made with traverse to prosecute the invention of producing titanium metal by reducing an anode. Affirmation of these elections must be made by applicant in replying to this Office action. Claims 16, 26, 28-29, 32-35, 36-45, 52-53, 47-51, 81-84, 86 and 106-109 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to non-elected inventions.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C 103(a) of the other invention.

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Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(I).

### ***Status of Claims***

Claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 85, 89-95 are currently under examination.

### ***Specification***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: (1) "Typical cathode current densities are in the 0.05 to 5 ampere/cm<sup>2</sup> range. The most desirable cathode current densities are in the 0.1 to 2.0 ampere/cm<sup>2</sup> range, and the preferred cathode current densities are in the 0.25 to 1 ampere/cm<sup>2</sup> range ..." (pg. 12, lines 19-23); and (2) "...the cell is sealed

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with a top 50, swept with argon purge to remove air, and voltage of 3 applied” (pg. 13, lines 21-22).

The disclosure is objected to because of the following informalities: omit the second “the” in “the reduced the suboxide” (pg. 9, line 1); “know” is used in place of “known” (pg. 9, line 8); “2a” is used in place of “2b” (pg. 10, line 14); and some missing words in “at as low cost as possible” (pg. 14, line 13).

### ***Claim Objections***

Claim 59 is objected to because of the following informalities: “... at least 1.1 over stoichiometry...” should be “ at least 1:1 over stoichiometry”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1, 60, 64-66, and 93-95 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Slatin (US Patent No. 2,994,650).

In regards to claims 1, 60, and 66, Slatin discloses a method for producing titanium metal which comprises electrochemically reducing an anode formed of a titanium dioxide and bone charcoal mixture (col. 1, lines 47-57 and col. 4, lines 11-40).

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The titanium dioxide is mixed with the charcoal in a molten salt electrolyte (col. 4, lines 11-40). The titanium produced from this method is 99.8% pure titanium (col. 4, lines 24-25).

In regards to claim 64 and 65, Slatin discloses a method for producing titanium metal which requires the titanium suboxide mixed with charcoal (carbon) in a ratio of eight moles of charcoal (carbon) to two moles of titanium dioxide (col. 4, lines 11-15).

In regards to claim 93-95, Slatin discloses a method for producing titanium where 10% by weight of titanium trichloride is reduced to 99.8% titanium in one step (col. 4, lines 20-28)

Claim 54 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Feige (US Patent No. 3,915,837).

In regards to claim 54, Feige discloses a method for the production of purified titanium from rutile ore which comprises electrowinning from an anode in a molten salt electrolyte (col. 2, lines 9-40).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



Claim 11, 12, 61, and 76-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slatin (US Patent No. 2,994,650), in view of Westfall (US Patent No. 5,215,631).

In regards to claims 11 and 76, Slatin meets the claim limitations as applied to claims 1, 60, 64-66, and 93-95 above, but Slatin does not disclose a method comprised of adding a strong Lewis acid to the molten salt electrolyte.

Westfall teaches a method of adding concentrated hydrochloric acid to a molten salt electrolyte (col. 9, lines 26-43). Adding concentrated hydrochloric acid accelerates the reaction of reducing an anode (col. 9, lines 26-43).

Therefore it would have been obvious to one of ordinary skill in the art to employ the method of adding concentrated hydrochloric acid to a molten salt electrolyte to reduce an anode, as disclosed by Westfall, to the method of Slatin, in order to accelerate the reaction of reducing an anode, as disclosed by Westfall (col. 9, lines 26-43).

In regards to claims 12, 61, and 77, Slatin meets the claim limitations as applied to claims 1, 60, 64-66, and 93-95 above, but Slatin does not disclose a method using an electrolyte with a eutectic mixture.

Westfall teaches a method of using a eutectic mixture electrolyte consisting of potassium fluoride, sodium fluoride, and lithium fluoride (col. 29, line 40). Eutectic mixture electrolytes allow for lower melting temperatures of the electrolyte, as disclosed by Westfall. (col. 31, lines 5-17).

Therefore it would have been obvious to one of ordinary skill in the art to employ

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the method of using a molten salt eutectic mixture electrolyte to reduce an anode, as disclosed by Westfall, to the method of Slatin, in order to allow for lower melting temperatures of the electrolyte, as disclosed by Westfall (col. 31, lines 5-17).

Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feige (US Patent No. 3,915,837), in view of Westfall (US Patent No. 5,215,631).

In regards to claim 55, Feige meets the claim limitations as applied to claim 54 above, but Feige does not disclose using an electrolyte with a eutectic mixture.

Westfall teaches a method of using a eutectic mixture electrolyte consisting of potassium fluoride, sodium fluoride, and lithium fluoride (col. 29, line 40). Eutectic mixture electrolytes allow for lower melting temperatures of the electrolyte (col. 31, lines 5-17).

Therefore it would have been obvious to one of ordinary skill in the art to employ the method of using a molten salt eutectic mixture electrolyte to reduce an anode, as disclosed by Westfall, to the method of Feige, in order to allow for lower melting temperatures of the electrolyte, as disclosed by Westfall (col. 31, lines 5-17).

Claim 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feige (US Patent No. 3,915,837), in view Slatin (US Patent No. 2,994,650).

In regards to claim 58-59, Feige meets the claim limitations as applied to claim 54 above, but Feige does not disclose a method where the titanium dioxide to carbon ratio is at least 1:1.5 or 1:1.

Slatin teaches a method where the titanium dioxide to carbon ratio is 2 moles

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of titanium dioxide to 8 moles of charcoal (carbon) (col. 4, lines 10-27). This method allows the titanium to react to completion and ions are not left in solution (col. 4, lines 10-40).

Therefore it would have been obvious to one of ordinary skill in the art to employ the method of using a titanium dioxide to carbon ratio of 2 moles of titanium dioxide to 8 moles of carbon, as disclosed by Slatin, to the method of Feige, in order to allow the titanium to react to completion and not leave ions left in solution, as disclosed by Slatin (col. 4, lines 10-40).

Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Slatin (US Patent No. 2,994,650), in view of Rand (US Patent No. 2,939,823).

In regards to claim 85, Slatin meets the claim limitations as applied to claims 1, 60, 64-66, and 93-95 above, but Slatin does not disclose a method comprised of heating a titanium oxide with carbon under an inert atmosphere.

Rand teaches a method comprised of heating a titanium oxide with carbon under an inert atmosphere (col. 2, lines 14-70). The presence of an internal barrier adds to the internal resistance of the cell and reduces overall efficiency of the process (col. 2, lines 41-45).

Therefore it would have been obvious to one of ordinary skill in the art to employ the method of using an inert atmosphere, as disclosed by Rand, to the method of Slatin, in order to prevent internal resistance of the cell and increase overall efficiency of the process, as disclosed by Rand (col. 2, lines 41-45).

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Claims 89, 90, 91, and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slatin (US Patent No. 2,994,650), in view of Dean (US Patent No. 2,904,428).

In regards to claims 89, 90, 91, and 92, Slatin meets the claim limitations as applied to claims 1, 60, 64-66, and 93-95 above, but Slatin does not disclose a method a comprised of adding a  $Ti^{=2}$  containing compound directly into an electrolyte.

Dean teaches a method of adding  $Ti^{=2}$  with a concentration of 5-25% by mass to an electrolyte solution (col. 1, lines 48-55 and col. 2, lines 25-43). Adding  $Ti^{=2}$  in a concentration of 5-25% by mass prevents anode slime (col. 2, lines 25-43).

The Examiner notes that the  $Ti^{=2}$  concentration within the electrolyte, as disclosed by Dean overlaps with the  $Ti^{=2}$  concentration within the electrolyte of the claimed invention.

Therefore it would have been obvious to one of ordinary skill in the art to employ a method of adding  $Ti^{=2}$  with a concentration of 5-25% by mass to an electrolyte solution, as disclosed by Dean, to the method of Slatin, in order to prevent the formation of anode slime, as disclosed by Dean (col. 2, lines 25-43).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 8 AM - 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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